Developing State-of-the-Art Technology in Anticipation of Society's Needs

The history of Tamagawa Seiki Co., Ltd. can be traced back to March 1938, when the company's founder, Hiroichi Hagimoto, established the company along the banks of the Tamagawa River in the south of Tokyo. Seeing the cleaner environment and a diligent labor force, and aiming to contribute to regional industrialization, he built the Iida Plant three years later in his hometown area in the Ina Valley, located in mountainous Nagano Prefecture several hours west of Tokyo. Since then, Tamagawa Seiki has significantly expanded its business from the manufacturing of instrument motors and tapping machines to the development of technologies in a wide variety of areas, including the manufacture and sale of products in the aviation/aerospace and industrial automation areas. Throughout its history, the company has endeavored to meet the changing needs of the times.
Motortronics Technology A new vision of the future

Motortronics®

The trademark 'Motortronics' is a compound derived from the words 'motor', 'electronics', and 'mechanics'. Used as the generic name of Tamagawa Seiki products, the name indicates how we integrate advanced technologies of motors, sensors, electronics and precision machinery in a balanced way.

Tamagawa Seiki applies the concept of Motortronics to the development and manufacture of all kinds of automated systems for the Amusement Application (AA), Car Application (CA), Defense Application (DA), Factory Application (FA) and Science Application (SA).

Since our foundation, for eight decades, we have constantly been at the frontier of angular accuracy in sensing technologies. The principles underlying what we attempt to achieve can be compared to the capabilities of the human body; sensor technologies are like the nervous system, electronics is like the brain, and precision machine technology like the body tissue. Also our software technology enhances the total function.

DRIVING FORWARD THE FRONTIERS OF TECHNOLOGY

From Sensors to Applied Systems — From the Office All the Way to Outer Space —

Throughout its history, Tamagawa Seiki has succeeded in manufacturing products with the most accurate angular control possible at-the-time.
This attitude will continue, even if it takes more than 10 years to improve the accuracy by 1 digit.

<table>
<thead>
<tr>
<th>α (arc sec)</th>
<th>x (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000arc sec (2.8 degrees)</td>
<td>35km</td>
</tr>
<tr>
<td>100arc sec (0.28 degrees)</td>
<td>350km</td>
</tr>
<tr>
<td>1arc sec (0.001 degrees)</td>
<td>35000km</td>
</tr>
<tr>
<td>10 arc sec</td>
<td>35km (Tokyo-Hachioji) (Iida-Ina)</td>
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<tr>
<td>0.1 arc sec</td>
<td>3500km (Tokyo-Hanoi, Vietnam)</td>
</tr>
<tr>
<td>0.01 arc sec</td>
<td>35000km (to Synchronous Satellite)</td>
</tr>
</tbody>
</table>

Ultra high-precision angle measuring equipment (Indexing accuracy=0.001 second of arc)
We deliver “Technology” to customers.

Tamagawa Seiki was founded from the development of defense-related products. Since 80 years, based on the highly reliable technology we have cultivated there, we are currently developing and manufacturing a wide range of products.

### Aviation, Space & Defense-Related Products

#### MAIN PRODUCTS:
- **Angular velocity sensors and systems**
  - Rate gyroscopes (mechanical type)
  - Gas rate sensors
  - Fiber optical gyroscopes
  - Ring laser gyroscopes
  - MEMS gyroscopes
  - Inertial measurement equipment
  - Attitude heading reference system
- **Accelerometers, Inclinometers**
  - Servo accelerometers
- **Aviation instruments**
  - Power supply (Rectifier, AC/DC, DC/DC)
  - Engine indicators and instruments
  - Aircraft indicators and instruments
  - Electric actuators and other instruments
- **Motors and Sensors for aviation**
  - Servo motors
  - AC servomotors
  - Step motors (2-phase / 5-phase)
  - Step motor encoders
  - DC motors
  - DC motor encoders
  - Rotary Encoders
    - Optical encoders
      - Absolutes
      - Incrementals
    - Magnetic encoders
  - LVDTs / RVDTs
  - Synchros
  - Synchros and resolvers
  - Brushless resolver “Smartsyn”
  - VR type resolvers “Singlsyn”
  - Multi-pole & speed synchros and resolvers
- **MEMS gyros**
- **Spatial stability equipment**
- **Test and inspection equipment**
  - Servo drivers and controllers
  - Trackballs
  - Teaching aids
  - Leisure equipment
  - Inertial measurement units

#### Motors and Sensors for Outer Space
- Reaction wheel
- Brushless synchros and resolvers
- Encoders
- Brushless DC motors / Resolvers (geared)
- Brushless DC motors / Encoders
- Step motors (geared)
- Actuators
- Vacuum equipment
- Ground test equipment
- Mechanical units for space instruments

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**These products play active role in 5 different application fields.**

- **Defense Application**
- **Car Application**
- **Factory Application**
**Servo Components**
From mechatronics fields of robots and NC machine tools to space-related technology

**MAIN PRODUCTS:**
- Servo motors
  - AC servo motors
- Step motors (2-phase / 5-phase)
- Step motor encoders
- DC motors
- DC motor encoders
- Rotary Encoders
  - Optical encoders
    - (Absolute / Incremental)
  - Magnetic encoders
- LVDTs/RVDTs
- Synchrons
- Synchrons and resolvers
- Brushless resolver “Smartsyn”
- VR type resolvers “Singlsyn”
- Multi-pole & speed synchrons and resolvers
- MEMS gyros

**System equipments**
From the frontier industry to underground and ocean-bottom technology

**MAIN PRODUCTS:**
- Iron and steel equipment
  - Spatial stability equipment
- Water treatment equipment
  - Test and inspection equipment
- Vehicle equipment
  - Smart Cam System
- Ship related equipment
  - Servo drivers and controllers
- Peripheral equipment for semiconductor manufacture
  - Teaching aids
- Machine tool components
  - Leisure equipment
- Logistics related equipment
  - Inertial measurement Unit
- Applied optics equipment
  - Inertial measurement Unit
- Medical care equipment

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**Quality Policy**
The tenacious commitment to the quality makes it possible to make things in the unit of “seconds”.

**Action Guidelines**
Providing our Products and Services to be Safety and Reliable to Customers

"Each one promises Quality without the compromise"

- We will assure the quality, cost and delivery of products by processes ourselves.
- We will execute exactly to conform to the requirements of customers and operate the quality management system, as well as compliance.
- We will aim to improve continuously the validity and efficiency of quality management system to increase its performance.
- We will settle the quality targets every year and place our effort to attain them in TQM activities.

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**Environment Policy**
We are promoting consideration to the environment from the viewpoint of CSR.

Based on corporate philosophy of “Striving to build an industry ready for the 21st century through creative business activities, contributing to the economic revitalization of communities”, we will make improving the environment a part of every step we take.
We develop important components for various automatic control machines and measurement control equipments. These products are delivered to customers in Japan and all over the world.

Network in Japan

Global Network and Performance
Global Network and Performance

WORLD’ MARKET RATIO (2017) $1=¥112

SALES MARKET (2017)

Transition of sales (Tamagawa Seiki Group)

For Exports

For Domestic

<table>
<thead>
<tr>
<th>Year</th>
<th>For Exports</th>
<th>For Domestic</th>
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<tbody>
<tr>
<td>2008</td>
<td>$370</td>
<td>$121</td>
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<tr>
<td>2009</td>
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<td>2010</td>
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<td>2016</td>
<td>$436</td>
<td>$135</td>
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<tr>
<td>2017</td>
<td>$346</td>
<td>$136</td>
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</table>

Consolidated sales
Unconsolidated Sales

$Millions/Year